

REMARKS/ARGUMENTS

The Office Action (1) rejected claims 1, 3 and 4 under 35 U.S.C 103(a) as being unpatentable over Matsuda et al. (JP 2-301133), in view of Lee et al. (U.S. 2003/0068898); (2) rejected claims 22-58, and 65-69 under 35 U.S.C 103(a) as being unpatentable over Matsuda et al. and Lee et al., as applied to claims 1-4 above, and further in view of TW article (Stress Control in Multi-Layer Backside Metallization of Thinned Wafers), APA (Admitted Prior Art), and LW article (Tailoring Sputtered Cr films on Large Wafer); (3) rejected claims 70-72 under 35 U.S.C 103(a) as being unpatentable over Matsuda et al. and Lee et al., as applied to claim 1 above, and further in view of Li et al. (US 2003/0017628); and (4) allowed claims 59-64.

1. Regarding the rejection based on Matsuda et al. in view of Lee et al., Applicant has modified the claims to overcome the Examiner's rejections. Specifically, Applicant has added the following limitations to the independent claims:

- physical RF plasma etch, wherein the ions of inert gas is supplied by physical RF plasma etch; and

- the material of the removed layer and that of the remaining wafer are the same, wherein the etching is to remove a layer of the wafer of the same material, and not a layer of different material.

Further, Applicant also added the following limitation to dependent claims:

- atomic roughness, wherein the surface after etch exhibits an atomic-scaled roughness in order tens of angstroms.

With the modified claims, Applicant submits that the present invention is not obvious over the prior arts of the combination of Matsuda et al. and Lee et al. for the following reasons, as mentioned in the previous response:

- Different mechanism. The present invention provides a *physical* RF plasma etch at high inert gas pressure with low energy ions while Matsuda et al. and Lee et al. both provide a *chemical* RF plasma etch.

- Different structure and process. The present invention discloses an etch process to remove the same material on the surface of a wafer. The removed material and the remaining material are the same. This is in contrast to Matsuda et al. etching a separate layer on the wafer (an oxide layer on a silicon wafer). The difference in structure provides the differences in process and process limitation:

a. Different process. The present invention employs one (1) step of RF plasma etch using inert gas to create a surface roughness while Matsuda et al. employs three (3) steps of: depositing a layer of silicon; oxidizing the silicon layer to form silicon oxide; and selective plasma etch between silicon and silicon oxide by reactive species of CF_4 , CCl_2F_2 , CCl_4 to create a surface roughness. Lee et al. only discloses a selective etching method using different reactive species of CF_4 / CH_xF_y / (O_2 or inert gas).

b. Different process limitation. The process from Matsuda et al. relies on the non-uniformity of the oxidation process, which results in a non-uniform oxide thickness. If the oxidation process is perfectly uniform, the surface underwent Matsuda et al.'s process would not be rough. In contrast, the present invention has no oxidation process, and no such limitation.

- Different roughness size. The surface roughness of Matsuda et al.'s process is in the order of 100\AA - 1000\AA (p. 159, top left box, lines 8-9) while the roughness of the present invention is atomic size (order of tens of angstroms) to accommodate a deposited layer of a few hundred angstroms (paragraph [31]).

Thus, Applicant submits that the present invention is not obvious to persons with ordinary skill in the art following a combination of Matsuda et al.' and Lee et al.'s teaching due to different mechanism, different process, different process limitation and different roughness size.

Claims 3 and 4 are dependent on independent claim 1, and, thus, are inventive for the same reason.

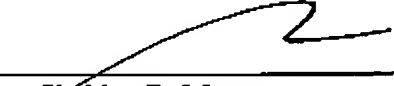
2. For claims 22-72, Applicant submits that the present invention is novel against Matsuda-Lee per the above reason, and, thus, the additional references of TW article, APA, LW article, and Li et al. would not render these claims obvious.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

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